SYNOPSIS OF THE THESIS ENTITLED

A GEOGRAPHICAL ANALYSIS OF FRUIT FARMING IN LATUR DISTRICT

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A Geographical Analysis of Fruit Farming in Latur District

1.1 Introduction:

Fruit farming means cultivation of fruit crops in large area in open fields on a commercial scale (K. Bhaskara Reddy). Fruit farming is the science and arts of growing fruit plants. This is one of the ways to improve economic condition of farmers. It is also helpful to maintain environmental balance in many ways. India, with its wide variability of climate and soil has good potential for growing a wide range of horticulture crops such as fruits, vegetables, and flowers. The arid zone of the country is potential area for fruits like apple, pear, apricot, almond and walnut, and among the temperate fruits ber, pomegranate, and fig. Fruits like grapes, ber, pomegranate, mango etc. have been in a steady increase in the area and production of the country. In the recent years the planners and policy makers in the developing economies are more interested in the contribution of fruit farming product to agricultural diversification, employment extension and foreign exchange earnings.

Fruit farming has credibility for improving productivity of land, generating employment, improving status of farmer, enhancing export potential, one-time of capital investment & continuous flow of money and eco-friendly system. In drought-prone areas huge waste land is under cultivation which is improving the rural economic structure. Fruit farming is also very important because the well-maintained established orchards give better returns than traditional crops. Traditional fruit crops are normally planted at the farm corners only to fulfill the family needs.

Geographical analysis of fruit farming is concerned with the physical and socio - economic factors. These factors affect the growth, size, quality & productivity of these fruit crops. Grapevine and pomegranate are

very sensitive to climatic changes for hail, humidity, rainfall cause to failure of the fruit crops.

1.2 Review of Related Literature:

The knowledge of research work done in the past relating to the research problem is necessary & helpful to proceed in the right direction. Researcher would be able to make an improvement over the existing studies and also expand horizon of investigation. The review could also help refuting the concepts & statements made in earlier studies as well as supporting the findings of present study following foreign as well as Indian, scholars who have contributed and carried out the study related to fruit farming in India.

Haroyasu, T. (1961):

According to him Grapes of excellent quality are produced by numerous varieties practiced on all soil types, except those of the very heaviest texture.

Alleweldt, G. (1963):

He stated in his book, that day length is important for vine breeding and growing which effect on growth, maturing and ripening.

Raj, Krishna (1963):

In his article he pointed that Indian farmers have been responsive to price change. The price changes are acting as the evocative factors to supply response.

Singh, R. L. (1969):

In his book "Fruit Farming" mentioned that from the nutritional point of view the mango is a rich source of vitamin "A" and has a fair amount of vitamin "C" also.

Singh Ranjit (1969):

He highlighted the production of mango, banana, grapes and guava with an objective to bring out the rich and diverse varieties of fruits in India.

Olmo, A. (1970):

He stated in his report to the government of India that there was 130 percent growth in the area of grape cultivation in the world. He also stated that the vines are supported on overhead arbors yields high and the principle varieties are Anab-e-Shahi, Bangalore, Thompson Seedless. Bhokri, Cheeria-7, and Muscat.

Winkler, A. J. (1974):

An American geographer has discussed in his book entitled "General viticulture" the composition of the fruit and factors influencing the developments of various components of the nature. The cluster of grapes consists of stems and berries. The stems consist of riches, branches and pedicel on which the berries are born, constituting 2 to 6 percent of the weight of cluster at maturity.

Singh, R.N. & Mujamdar, P.K. (1975):

In their article entitled "Improvement of Mango through Hybridization" published in 'Fruit Breeding in India' stated that there is an enormous wealth of mango cultivation in this country which is evident from the number of mango monographs that have been published from time to time.

Majid, Husain (1979):

He has made important contribution in his book entitled "Agricultural Geography" that fruit farms are small and are located where communication links with the consumption centres are appreciably good. Soil fertility is maintained by the heavy application of manures and fertilizers.

Thomas, T. Sturrock (1979):

They stated in their article 'Mango Breeding in Florida' published in Fruit Breeding in India Edited by G. S. Nijjar, that history records the fact that mangoes have been cultivated in India for over four thousand years.

Nijjar, G. S. (1985):

In his book "Fruit Breeding in India" stated that fruit improvement is a slow process but some outstanding improvement has been made in this regard in India in the recent past.

Anonymous, (1986):

In his report submitted to agricultural review committee of MPKV Rahuri, he stated about the cultivation practices adopted by grape growers and their land holding size.

Sengupta (1986):

In his report to regarding the "Prospects for exports," cereals, fruits and vegetable" , he said that contribution of horticultural crops to national income and improvement the economic status of individuals can also be accessed through a study of cost benefit analysis of individual crops.

Kaul, G. L. (1989):

He mentioned in his book "Horticultural Crops in India" that India has established a world record in grape productivity with an average of 22 tons per hectare and a maximum 50 tons per hectare from vineyards located in peninsular India where two crops are taken each year.

Kolhe, Committee Report (1991):

This is committee formed by government of Maharashtra for the development of fruit growth potential in drought prone area of Maharashtra, In his report committee has rightly pointed out the significance of horticultural crops for the development of the state economy. This committee has acquired importance all over the world

because of horticultural crops play an important role in human nutrition, help to improve the economic status of the farmers, generate employment potential on farm and non-farm sectors in rural area and help in conserving soil and environment.

Pujari, A. G. (1993):

In his Ph.D thesis entitled "The Progress and Prospects for Development of Pomegranate and Ber Fruits in Solapur District" he stated that about the cost of establishment, cost of cultivation and cost – benefit ratio of ber and pomegranate orchards.

Acharya, S. S. (1994):

In his article published in Indian journal of agricultural marketing, he stated that price support policy of pomegranate, Mango, grape and banana can better be implemented through regulated market. He also described, considerable saving in the cost of human labour, bullock labour, machinery, manures and fertilizers, plant protection and irrigation.

Dangat, S. V. et. al. (1997):

In their article entitled "Marketing of grapes through co-operatives in Pune district" stated the importance of co-operative marketing associations formed by ;pthe grape growers in the study area. Co-operative societies render technical guidance to their members and also arranged transport and sale of grapes ultimately result in maximizing net profit of grape growers.

Handiganar, S. S. *et. al.* (1998):

They studied, the cost and return in grape cultivation in Bijapur district, Karnataka during the year 1993-94 based on the data of 80 grape growers. The initial investment was worked out Rs. 1,79,475.14 in spacing –I, Rs. 1,50,634.19 in spacing –II under telephone trellis system. The maintenance cost up to gestation period was worked out to Rs. 1,17,874.44, Rs. 1,00,100.67, Rs. 87,176.69 and Rs. 72,538.18 for four spacing under

two systems respectively. The total cost of production of grape for four spacing under consideration during the period was Rs. 1,57,519.80, Rs. 1,35,508 Rs. 1,11,529.14 and Rs. 99,591.85 and the net income for the same.

Pawar, C.T. and Phule, B.R. (2000):

In their article 'Fruit Farming in Drought Prone Area of Maharashtra - A Micro Level Analysis of Pomegranate Farming", they highlight the various aspects of fruit farming with special reference to pomegranate in drought-prone area of Maharashtra.

Bose, T.K., Mitra, S.K. (2001):

In the book entitled "Fruits: Tropical and subtropical" they stated about the importance of selecting a site for planting, vicinity to market, road, railway station, storage facility and preservation facility while planting the fruit crops.

Pawar, C. T. and Phule, B. R. (2001):

In his article entitled "Geographical Perspective on Fruit Farming in Drought-prone Area: A Case Study of Solapur District", they attempt to study the cultivation of ber and pomegranate in the drought prone area of solapur district and stated that Ber & Pomegranate fruit crops are most suited and well-survived fruit crops in this region.

Fhule, B. R. (2002):

He in his unpublished Ph.D thesis entitled "Pomegranate Cultivation in Solapur District", stated about the pomegranate cultivation in drought prone area. He also mentioned that pomegranate fruit crop is most suited fruit crop in the drought prone area of Solapur district.

Jadhav, M. S. & Patole, S. D. (2002):

They have calculated per hectare and per quintal cost of cultivation for several varieties of grapes in western Maharashtra. The average per hectare cost of cultivation was the highest and it was Rs. 2,61,495.59 in

Sonaka, Rs. 2,06,454 in Thompson seedless, Rs. 1,71,061 in Tas-a-Genesh and Rs. 1,42,761 in Manik Chaman. The share of cost 'A' in the total cost ranged 40.12 to 54.39 percent in all varieties. The share of insecticides and pesticides was observed the highest and it range 9.25 to 21.15 percent followed by hired human labour days (4.55 to 14.45 percent) and manure (2.15 to 6.24 percent). The per hectare cost 'B' share value was 94 to 97 percent in all the varieties. The per quintal cost of production thus in Thompson seedless, Sonaka, Manik Chaman, Kismis, Tas-a-Ganesh, Sharad Seedless and Flame seedless variety of grape worked out to Rs. 945.93, Rs. 1029.80 Rs. 848.96 Rs. 1410.37, Rs. 883.03, Rs. 1043.79 and Rs. 1065.12 respectively. The benefit cost ratio at cost 'C' worked out to be 1.44 in Thompson Seedless, 1.33 in Sonaka, 1.55 in Manik Chaman, 0.94 in Kismis, 1.60 in Tas-a-Ganesh, 1.90 in Sharad Seedless and 2.28 in Flame Seedless variety.

Autkar, V. N. & Nagpure, S.C. (2003):

In their article 'Export of Grape in Global Market' reported that production of grapes in India is estimated to be 6.03 lakh metric tons and area under cultivation of grape is 35920 hectare, in terms of area and production: Maharashtra is the leading state in country followed by Karnataka, Andhra Pradesh, and Tamil Nadu. The average productivity of grape appears to be 23.73 metric tons. The export of grape has steadily increased from 0.04 lakh metric tons during 1997-98. The percentage share of export of grapes to total production is to 2.48% of total production from 0.98% during 1989-90.

The major importing countries of grapes are U.K., Bangladesh, Netherlands and UAE. Thus, globalization of agriculture offers an opportunity of deriving large benefits through massive increasing export. Specially export of high value crop and labour intensive allied agriculture

product. Thus globalization calls for diversification of Indian Agriculture, which can take place after generally large agriculture surplus.

Bal, J. S. (2003):

In his Book "Fruit Growing" he tried to give scope of fruit farming in India. He stated that the living standard of the people can be judged by production and consumption of fruits per capita. He has also pointed out that India is climatically favorable for the production of a variety fruits.

Jugale, V. B. (2004):

In his book entitled "Horticulture economy of Maharashtra" he pointed out that the Maharashtra State has ample potential to develop horticulture economy, which is availed in the form of specific agro-climatic characteristics, infrastructural facilities and other services required for the horticultural development.

Hajare, R.V. (2007):

He recorded in his Ph.D. thesis entitled "A study of Fruit Farming in Maharashtra Plateau" that though the fruit farming is not native to this region it has emerged as well as established form of land-use with passage of time and has been done successfully. This region has developed various fruit pockets. The geographical setting and ecological factors have given boost to fruit farming.

Reddy, A. Venkat & Rao, P. Nagwane (2009):

They brought out a study on "Production and Post-harvest Technology in Mango" published in Agro-bios News Letter. The paper highlights the importance of Mango in human diet and that United States of America also agreed to import Indian mangos, because fruits are treated with heat-vapor treatment and infrared-ray treatment.

Todkari, G.U. (2009):

In his Ph.D thesis entitled "Impact of environmental factors on crop land use in Solapur district with Special reference to grapevine cultivation"

he analysed the Spatio-temporal variation in grape fruit farming, economy, and marketing of graps in Solapur district.

Prasad, S. and Kumar, U. (2010):

In his book "A Handbook of Fruit Production" stated that the nature is given to diverse geographical soil and agro-climatic condition in varies region. Hence it is possible to grow various kinds of fruits in the different stats of India. The classification of fruit reflects the fundamental structure of the flowers from which the fruits are derived. The fruit is as the product of the entire gynoecium and the floral parts that may be associated with the gynoecium at the fruit age.

This review of literature, though not complete, shows that the geographical aspects of fruit cultivation in general is much neglected therefore an attempt will be made here in this direction to present the A geographical analysis of fruit farming in Latur district.

1.3 Selection and Importance of the Topic:

Study of fruit farming is very important for the developing countries like India in order to meet increasing demand of food, to make a balanced diet, to improve the rural economy, to solve the problem of unemployment, to bring the huge waste land under cultivation, to improving the economic condition of farmers in drought-prone area to develop agro-based industries in rural area. It is also important because it plays an important role in generating employment potential in farm and non-farm sector. They are best situated for agro-forestry, social forestry and water-shade development programme.

The economic aspect of fruit farming i.e. well maintained and established orchards, give better returns than the traditional crops. The importance lies in per unit area yield, high net profit, source of raw material, efficient utilization of resources, and utilization of waste and barren land, ability of earning for high exchange, one-time capital

investment and continuous flow of money. Moreover, fruit farming is one of the important branch which diversified farming in the study region. It also promises the development of several ancillary industries like preservation, dehydration, essence oils, packages, transport and refrigeration etc.

Importance of fruits in the human diet is universally recognized. Fruits are the chief source of vitamins, without which the human body cannot maintain proper health & resistance to diseases. For all these purposes the use of fruits in our daily diet is very important. Fruits are very nutritious containing various nutrients in various amounts. (Table No. 1.1) According to nutrition expert, an individual should consume at least 85g fruits per day in addition to vegetable and other food source to maintain proper health.

Table No. 1.1. Mineral Composition of Selected Fruits

Sr. No.	Fruits	Calcium (mg/100 gram)	Iron (mg/100 gram)	Magnesium (mg/100 gram)	Phosphorus (mg/100 gram)	Potassium (mg/100 gram)
1	Mango	14	0.25	11	23	143
2	Grape	37	0.26	14	24	203
3	Pomegranate	10	0.30	12	36	236
4	Custard Apple	22	0.70	50	16	618
5	Tamarind	34	0.65	12	44	480
6	Ber	25.6	1.8	12	43	589
7	Dragun Fruit	8.5	1.9	13	22.5	320
8	Guava	18	0.26	22	40	417
9	Sapota	21	0.80	12	12	193
10	Orange	37	0.1	10	18	154

Source: *Fruit Growing in India, National Publication, Ltd. New Delhi.*

For all these purposes the use of fruits in our daily diet is very important.

1.4 Selection of the Study Region:

India is a predominantly agricultural nation and Maharashtra state in India occupies a very important position which ranks third in area and second in population. Fruit farming is mainly concentrated in Nasik, Amravati, Ahmenagar, Jalgaon, Nagpur and Solapur districts.

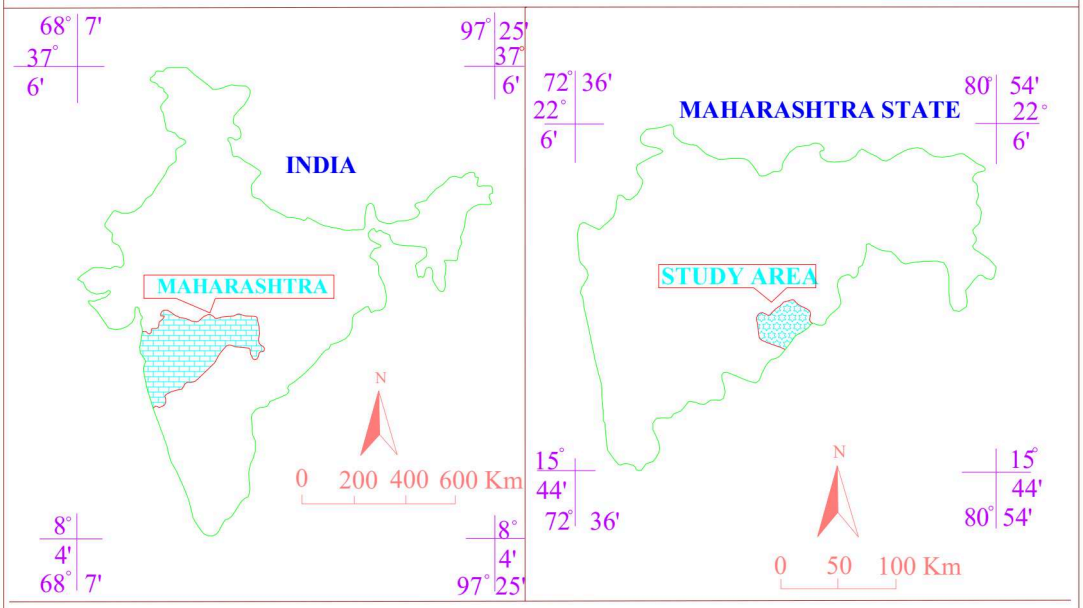
This district is leading in respect of area and production under fruit crops. Though the fruit farming is not native to this region, it has emerged as well as established form of land-use with the passage of time and has been done successfully. Within Maharashtra the Latur district has significant position as regards to area. There is good scope to increase the area under fruit crops. The geographical setting and ecological factors have given boost to it.

The district of Latur lies between $17^0$12' to $18^0$50' north latitudes and $76^0$12' to $77^0$18' east longitudes. It is surrounded by Beed and Parbhani district in the north, Nanded district in the north-east, Karnataka state in the south-east and Osmanabad district in the west and north-west.

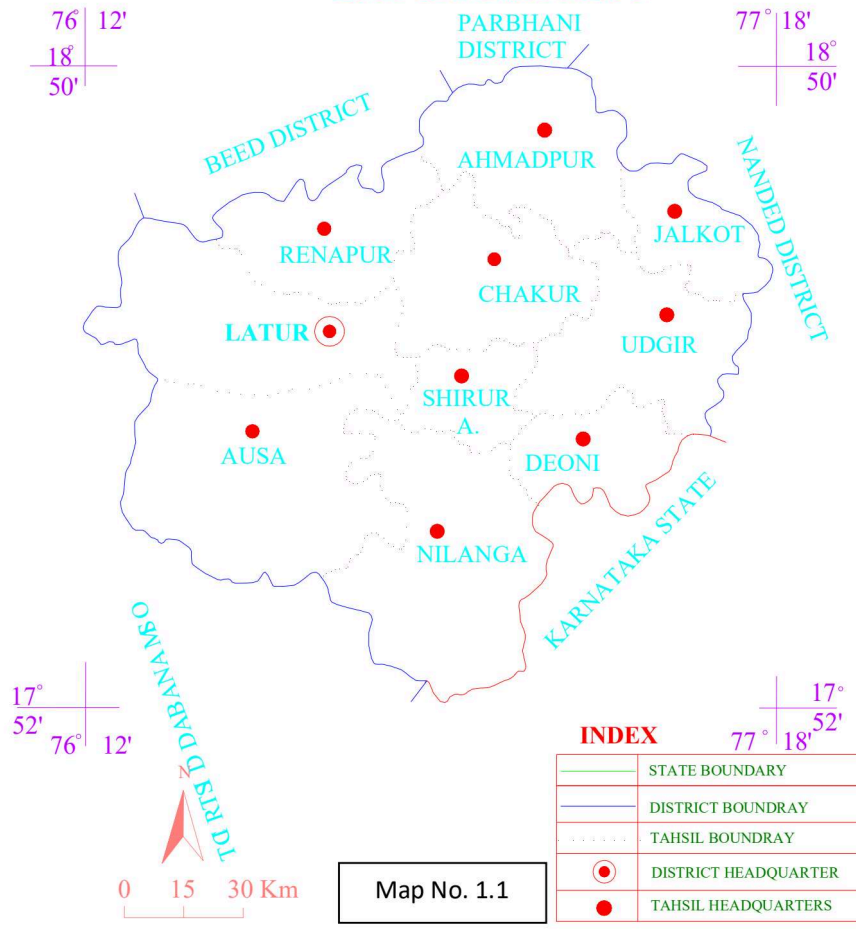
The Latur district has an area of 7,157 sq.km. and population 24,55,543 as per 2011 census. Out of the total population of the district 74.53 percent lives in rural areas while 25.47 percent lives in urban areas. There is a spatial variation in the socio-economic development in the study region. Economy of the study region is mainly based on agriculture and agro-based industries (Map No. 1.1).

Out of the total working population 54.80 percent population in the study region is working in primary activities. Region has the limited irrigation facilities through wells, tube wells and canals. The percentage of gross irrigated area to gross cropped area is 17 percent, percentage of irrigated area varies from tahsil to tahsil, which ultimately effect on the development of agriculture in the study region.

LOCATION MAP



LATUR DISTRICT



Map No. 1.1

1.5 Objectives of the Study:

Following are the main objectives of the study:

1. To examine the role of physical determinants on the development of fruit cultivation in study region.
2. To assess the impact of socio-economic determinants on the fruit farming of the study region.
3. To evaluate the Spatio-temporal changes in fruit farming in the study region.
4. To assess the cost and return structure of major fruits i.e. economics of major fruits cultivation.
5. To analyze the characteristics of sample fruit growers in the study region.
6. To examine the satisfaction level of fruit growers about infrastructural facilities available for the fruit cultivation in the study region.
7. To find out the various problems faced by fruit growers in the study region and suggest appropriate measures to solve them.

1.6 Database and Methodology:

Data will be collected through primary and secondary sources. Primary data will be collected through field visits to the fruit orchards with interview schedule for which special interview schedule was prepared by considering objectives of the study. Data regarding the fruit orchards was collected by observation of the fruit gardens and personal talk with the fruit growers. Secondary data will be obtained from socio-economic reviews of the district, district census handbooks, gazetteers, agricultural epitomes, bulletins, periodicals, seasons and crop reports, etc. The data thus collected through primary and secondary sources will be classified, tabulated and analyzed by using various statistical techniques and presented by using various cartographic methods by using GIS.

In the present work Latur District is selected as a study region in general and each tahsil of the district as a component areal unit. Period of investigation is of twenty years (2000-01 to 2020-21). Mango, Grape, Pomegranate, Custard Apple, Tamarind, Ber, Dragun Fruit, Guava, Sapota and Orange are the major fruit crops of the region and are considered for micro level analysis.

From each region 20 villages will be selected by using stratified random and purposive sampling technique. From each village four fruit growers will be selected by giving due weightage to land holding size, area under fruits, irrigation facilities, nature of soils, nearness to market and transport routes. Thus total 80 fruit growers are selected for micro level study. The data regarding the sample fruit growers will be collected by actual field work by using interview schedule.

In the present study various methods and techniques will be used however it is not appropriate here to give all details. The details regarding various methods and techniques are discussed in the dissertation at appropriate places.

Sum of the methods used in the analysis of the present study will be given below.

In the present study Weaver's method will be used for fruit crop combination. The procedure of this technique is explained as follows-

$$SD = \sqrt{\frac{\sum d^2}{n}}$$

However, as Weaver pointed out, the relative, not absolute value being significant, square roots were extracted, so the actual formula used was as follows:-

$$\text{Variance} = \frac{\sum d^2}{n}$$

Where,

d = the difference between the crop percentage in a given areal unit and the percentage in the theoretical percentage.

n = the number of crops in a given combination.

Cost of Establishment and cultivation -

To determine the per hectare cost of establishment, per hectare cost of cultivation and cost & returns structure of fruit cultivation, three cost concepts viz. cost- 'A', Cost- 'B' and Cost- 'C' is used.

Cost- 'A':

It includes the cost on account of hired human labour, total machinery labour charges, cost of grafts, cost of manure and fertilizers, cost of insecticides and pesticides, cost of supportive materials, cost of training structure, irrigation charges, depreciation of implements and farm building, land revenues, and other taxes as well as interest on working capital. Thus cost 'A' is sum of value of all above items.

Cost- 'B':

Comprises of cost 'A' plus imputed rental value of owned land and imputed interest on fixed capital (excluding land).

Cost- 'C':

Comprises cost 'B' plus imputed value of family labour.

The fruit garden once established, one can harvest fruits every year. The production activity can be continued up to 20 years from fruit orchards. However, economic life of Grape Garden was considered as 15 years, 10 years for pomegranate, for Ber 10 years & 35 years for Mango. Rate of interest was 9 percent per year. On the basis of above the establishment cost was amortized (a) by using following formula:

$$a = \frac{Ar\,(r+1)^n}{(r+1)^n - 1}$$

Where,

a = Amortised cost

A = cost ‘c’

r = Rate of interest

n = Economic life of fruit orchard (yrs.)

1.7 Tentative Chapter Scheme:

The present study entitled ‘A Geographical Analysis of Fruit Farming in Latur District’ will be based on the above objectives and methodology. The entire work will be organized in to seven chapters.

Chapter I: Introduction

The chapter first deals with the Introduction, Introduction of the problem, Review of the Literature, importance of the topic, selection of the study region, Objectives of the study, Database and Methodology and Chapter outline etc.

Chapter II: Geographical Personality of the Study Region

This second chapter throws light on the physical and socio-economic aspects of the study area. Physical aspects like geographical location, relief, natural drainage system, climate, soil types etc. and socio- economic aspects like population, irrigation facilities, transport and communication facilities etc. are considered to determine geographical personality of the study region with respect to fruit farming.

Chapter III: General Landuse and Cropping Pattern

Third chapter is mainly concerned with the general land use and cropping pattern of the study region. It includes the changes in general land use and cropping pattern over a period of twenty years (2001 to 2021).

Chapter IV: Basic Aspect of Fruit Farming

Fourth chapter deals with basic aspects of the fruit cultivation. It includes the study of location and site of fruit orchards, topography, climate, soil, training, pruning, water management, fertilizers, post-harvest management, transportation, Marketing, etc, provide basic information

regarding the fruit cultivation which will be useful for reduce the cost of cultivation, to increase the production, yield and quality of fruits.

Chapter V: Spatial Distribution of Fruit Farming

Fifth chapter devoted to spatial distribution of fruit farming in the study area. It includes fruit growing regions of India and Maharashtra, spatial analysis of Mango, Grape, Pomegranate, Custard Apple, Tamarind, Ber, Dragun Fruit, Guava, Sapota and Orange fruit crops with their temporal growth. This chapter also includes the fruit ranking and fruit combination regions of the study area.

Chapter VI: Analysis of Survey Work

Sixth chapter deals with Analysis of survey work. This chapter will be completely based on the field survey data. It includes the economics of fruit farming i.e. cost and return structure fruit crop cultivation, socio-economic characteristic of fruit growers and satisfaction level of fruit growers regarding the infrastructural facilities available in the study area.

Chapter VII: Conclusions, Problems and Suggestions

The last chapter deals with conclusions, problems and suggestions. In this chapter results emerged from the analysis of the data in the preceding chapters are stated in form of conclusions. The problems related with fruit cultivation discussed in detail. The important suggestions are also given in this chapter to improve the overall condition of the fruit cultivation in the study area.

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